

REMARKS

Allowable Claims

Claims 35-44 and 51-60 have been objected to by the Examiner as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Accordingly, Claim 35 has been rewritten in independent form to include all of the limitations of base Claim 31.

Accordingly, Claim 51 has been rewritten in independent form to include all of the limitations of base Claim 47.

Claims 36-46, being dependent from allowed Claim 35, are urged to be allowable therewith.

Claims 52-62, being dependent from allowed Claim 51, are urged to be allowable therewith.

Claim Rejections 35 U.S.C. 102(b)

The Examiner has rejected Claims 31-33, 45, 47-49, and 61 under 35 U.S.C. 102(b) as being anticipated by Fischer et al (4,382,585).

It is respectfully submitted that Claim 45, being dependent from allowable Claim 36, is allowable therewith and that Claim 61, being dependent from allowed Claim 51, is also allowable therewith.

Concerning Claims 31-34 and 47-50, please note that that these claims have been amended to specify that said formed piece forms said deflection surface for the cooling medium in axial extension of said connection piece.

The aforementioned feature is neither disclosed nor suggested by Fischer et al. Indeed, the plug 4 shown in Fig. 2 and 5 of Fischer et al. obviously does not form a deflection surface in axial extension of the connection tube or sleeve. Consequently, it is urged that the Examiner's rejection under 35 U.S.C. 102(b) cannot be maintained with regard to amended Claims 31-34 and 47-50.

Claim Rejections 35 U.S.C. 103(a)

The Examiner has rejected Claims 34 and 50 under U.S.C. 103(a) as being unpatentable over Fischer et al. (4,382,585) in view of Stumbough (2,911,235).

The object underlying the invention as claimed in Claims 31 and 47 is to improve the flow conditions for the cooling medium at the transition between the cooling channel and the connection pieces in a cooling plate that does not have cooling channels formed by a sand core in a mould-casting operation or by cast-in cooling-pipes, in particular in a cooling plate with drilled cooling channels, as described at page 2 of the applicants specification in DE-A-2907511 or in a cooling plate with cooling channels formed as a continuous duct in a continuous casting operation, as also described at page 2 in WO-98/30345.

The present invention as claimed in amended Claims 31-34 and 47-50 achieves this object by a formed piece that is fitted in a preformed, externally accessible recess in the cooling plate body so as to form a deflection surface for the recess in the cooling plate body so as to form a deflection surface for the cooling medium flowing from the connection piece into the cooling duct or from the cooling duct into the connection piece in axial extension of the connection piece.

It will be appreciated that the present invention achieves the following advantages:

- 1) Pressure drops in the cooling plate are substantially reduced, which has a favorable effect on energy consumption for circulation of the cooling medium.

2) The risk of steam bubble formation due to high local pressure drops is likewise greatly reduced.

3) Escape of the air during filling of the cooling plates with the cooling medium is simplified by the deflection surface according to the invention; in other words, the deflection surfaces according to the invention prevent air pockets from forming in the cooling ducts and causing so-called "hot spots", as more fully explained at page 4, first paragraph, of the specification.

It should further be appreciated that the invention applied to a cooling plate manufactured by a method as described in DE-A-2907511 (drilled cooling channels) or in WO98/30345 (cooling channels formed as a continuous duct in a continuous casting operation), results in a substantial reduction of pressure drops. Consequently, with the present invention, the cooling plates described in DE-A-2907511 and in WO98/30345 can also be used if low pressure losses are required, which was not possible before.

Stumbough discloses a "clean-out fitting" to be used in plumbing waste lines, i.e. a T-fitting connecting a waste delivery pipe to a waste discharge pipe and allowing to introduce a clean-out tool into these pipes.

It is highly improbable that a person skilled in the art of manufacturing cooling plates for iron- and steelmaking furnaces, who wants to reduce pressure drops in a cooling plate that does not have cast-in cooling pipes, would consider a teaching relating to a T-fitting for pipes, and a *fortiori* to a T-fitting for pipes that is mounted in a plumbing waste pipe assembly for being able to introduce a clean-out tool into this pipe assembly. Indeed, *a priori*, it doesn't make any sense to consider a teaching relating to a pipe fitting if one is confronted to a situation in which the problem resides in the fact that there are not longer pipes to be connected by fittings.

Furthermore, Stumbough's teaching is, *a priori*, not at all relevant with regard to an improvement of flow conditions at the transition between a cooling channel and a connection piece opening into said cooling channel. The main object of Stumbough's

beveled insert 22 is to deflect a flexible clean-out tool by its beveled face 28 (see col. 1, lines 46-50 and col. 2, lines 35-46). A secondary object mentioned by Stumbough with regard to his beveled insert 22 is to prevent the portion of passage 6 that is occupied by the insert 22 from becoming clogged and jammed by solid waste and sediment, as commonly occurs in such fittings in waste discharge pipes (see col. 2, lines 47-53).

There is no teaching in Stumbough's disclosure that would lead to the conclusion that the beveled insert 22 might also be of interest for reducing pressure losses, for avoiding steam bubble formation or for avoiding air pockets resulting in "hot spots".

In conclusion, only hindsight knowledge of the invention claimed in the present application would allow consideration of Stumbough's beveled insert 22 as a contribution to the invention claimed in Claims 31 and 47.

The Examiner has rejected Claims 46 and 62 under 35 U.S.C. 103(a) as being unpatentable over Fischer et al. (4,382,585) in view of Stein (5,904,893).

Claim 46, being dependent from allowed Claim 35, is urged to be allowable therewith, wherefore applicants request that this rejection be withdrawn.

Claim 62, being dependent from allow Claim 51, is urged to be allowable therewith, wherefore applicants request that this rejection be withdrawn.

CONCLUSION

In view of the remarks above, it is respectfully submitted that claims 31-62 are allowable, and an early action to that effect is earnestly solicited.

Please charge the fee for the attached Two-Month Extension of Time to our Deposit Account No. 13-0235. It is believed that no additional fees or deficiencies in fees are owed. However, authorization is hereby given to charge our Deposit Account No. 13-0235 in the event any additional fees are owed.

Respectfully submitted,

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